

REMARKS

Claims 1-11 are pending in this application. By this Amendment, the title of the invention and claims 1-7 are amended, and claims 8-11 are added. In addition, a new Abstract is submitted. Reconsideration in view of the above amendments and remarks is respectfully requested. Unless otherwise indicated in the remarks set forth below, the amendments to the claims are made for the purpose of correcting informalities and/or to more clearly define the claimed invention, and are not made for the purpose of overcoming the cited art.

OBJECTION TO THE TITLE OF THE INVENTION

The Office Action objects to the title of the invention as not descriptive. The title has been amended to one that is clearly indicative of the present invention. Accordingly, withdrawal of the objection to the title of the invention is respectfully requested.

OBJECTION TO THE ABSTRACT

The Office Action objects to the length of the abstract. A new abstract of the appropriate length has been provided. Therefore, withdrawal of this rejection is respectfully requested.

REJECTION UNDER 35 U.S.C. § 103(A)

The Office Action rejects claims 1-4 under 35 U.S.C. § 103(a) as unpatentable over Daneman et al. (U.S. Patent No. 6,330,102) in view of Magel et al. (U.S. Patent No. 5,155,778). This rejection is respectfully traversed.

Applicants respectfully submit that Daneman and Magel fail to establish a *prima facia* case of obviousness as required under 35 U.S.C. § 103(a). The Office Action alleges that Daneman teaches all of the features of claim 1, with the exception of a substrate. The Office Action also alleges that Magel discloses an optical switch with optical elements, such as fibers, mirrors, and lenses situated and fixed on a substrate.

However, Applicants respectfully submit that Daneman fails to teach or suggest an input optical fiber part attached to a first substrate, an output optical fiber part attached to the first substrate and positioned at a distance from the input optical fiber part, a first micro-mirror part attached to the first substrate and positioned between the input optical fiber part and the output optical fiber part, a second micro-mirror part attached to the first substrate and positioned to reflect light from the first micro-mirror part to the output optical fiber part, wherein at least two of the input optical fiber part, the output optical fiber part, the first micro-mirror part and the second micro-mirror part are mechanically coupled to respective alignment grooves formed in the first substrate, as recited in claim 1.

This is because the teaching of Daneman is directed solely at elements that form a beam steering module and switching system, and does not address how the individual components of

the beam steering module are attached. Fig. 2 of Daneman, which the Office Action refers to, simply shows an input fiber lens array, and output fiber lens array, and two single axis mirror arrays positioned between the input and output fiber lens arrays. There is no mention or discussion as to how these components may be attached to, for example, a substrate. Since Daneman does not even address the issue of attaching the various components to a substrate, Daneman certainly does not teach or suggest respective alignment grooves formed in a first substrate that are mechanically coupled to at least two of an input optical fiber part, an output optical fiber part, a first micro-mirror part and a second micro-mirror part, as recited in claim 1.

Further, Magel fails to remedy the deficiencies noted above in Daneman. Magel discloses an optical switch in which lenses are attached to a substrate. For example, see Fig. 1 of Magel, in which lenses 14a and 14b are attached to a substrate 10.

The Examiner alleges that it would have been obvious to one of ordinary skill in the art at that at the time the invention was made to have fixed the elements disclosed by Daneman on a substrate as in Magel. However, even if the elements disclosed by Daneman were attached on a substrate in the manner taught by Magel, it would teach away from the present invention, because Magel teaches the use of a spatial light modulator 18 that is detached from the substrate 10 on which the input and output fibers are attached (See, for example, Figs. 1 and 5 of Magel).

Further, Magel teaches the use of a single spatial light modulator for directing light between the input and output fibers. The second set of mirrors used in Magel are fixed mirrors (elements 16a and 16b in Fig. 1) formed from the substrate 10. Thus, there is absolutely no

teaching or suggestion as to how the first and second mirror arrays of Daneman would be positioned on and attached to a common substrate.

Thus, for at least the reasons set forth above, Applicants respectfully submit that the combination of Daneman and Magel fail to render obvious the subject matter of claim 1. Claims 2-4 depend from claim 1, and thus are also allowable for at least the reasons set forth above, and for the additional features they recite.

For example, claim 2 recites that the input and output optical fiber parts, and the first and second micro-mirror parts are each mechanically coupled to respective alignment grooves formed in the first substrate. Daneman and Magel, either alone or in combination, fail to teach or suggest these features. As discussed above, Daneman fails to even address the issue of attaching the various components to a substrate, and Magel specifically teaches away from attaching a steering mirror on the same substrate as the input and output optical fibers.

With respect to claim 3, Daneman and Magel, either alone or in combination, fail to teach or suggest that the respective alignment grooves have upper slope sides and lower vertical sides, to form a “Y”. The Office Action alleges that Magel’s description of “properly dimensioned grooves” teaches the Y-shaped grooves recited in claim 3. However, Applicants respectfully submit that the “properly dimensioned grooves” taught by Magel refer to grooves that have the same shape as the component they are designed to support, as shown in Figs. 1-3, 5 and 6 of Magel. This teaches away from the Y-shaped grooves recited in claim 3.

Accordingly, for at least the reasons set forth above, withdrawal of the rejection of claims 1-4 under 35 U.S.C. § 103(a) is respectfully requested.

The Office Action rejects claims 5-7 under 35 U.S.C. § 103(a) as unpatentable over Daneman and Magel, in view of Peale et al. (U.S. Patent No. 6,480,645). This rejection is respectfully traversed.

Claims 5-7 depend from claim 1. Thus, Applicants respectfully submit that claims 5-7 are allowable for at least the reasons set forth above, as well as for the additional features they recite. Further, Peale fails to remedy the deficiencies noted above in Daneman and Magel.

In addition, the Office Action alleges that Peale discloses an optical switch with a substrate at the face of the plurality of input and output fiber parts. The Office Action refers to elements 30 and 35 of Fig. 2 in Peale to support this assertion. However, Applicants respectfully submit that elements 30 and 35 are lens arrays spaced apart from respective fiber arrays 20 and 25. This teaches away from an array of optical fibers coupled to a support substrate, as recited in claim 6. Thus, withdrawal of the rejection of claims 5-7 under 35 U.S.C. § 103(a) is respectfully requested.

ADDED CLAIMS

By this Amendment, claims 8-11 are added to the application. It is respectfully submitted that the added claims are allowable over the references of record.

CONCLUSION

In view of the foregoing amendments and remarks, it is respectfully submitted that the application is in condition for allowance. If the Examiner believes that any additional changes would place the application in better condition for allowance, the Examiner is invited to contact the undersigned attorney, René A. Vazquez, at the telephone number listed below.

To the extent necessary, a petition for an extension of time under 37 C.F.R. 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this, concurrent and future replies, including extension of time fees, to Deposit Account 16-0607 and please credit any excess fees to such deposit account.

Respectfully submitted,
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